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Robert Peccia &  
Associates  
Final report for  
the Divide Coal  
Mines Abandoned  
Mine Reclamation  
Project

FINAL REPORT  
FOR THE  
DIVIDE COAL MINES ABANDONED  
MINE RECLAMATION PROJECT

MONT A/E86-46-132

STATE DOCUMENTS COLLECTION

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FINAL REPORT  
FOR THE  
DIVIDE COAL MINES ABANDONED  
MINE RECLAMATION PROJECT

MONT A/E86-46-132

DECEMBER, 1987



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DIVIDE COAL MINES  
ABANDONED MINE RECLAMATION PROJECT

I. INTRODUCTION

The construction phase to reclaim the abandoned coal mine sites on the McDonald Divide in Fergus County began on June 16, 1987; project completion was achieved on November 8, 1987. The work was performed by Donnes Construction of Billings, Montana under a contract with the Montana Department of State Lands, Abandoned Mine Reclamation Bureau, MONT A/E 86-46-132.

The reclamation plan and construction specifications were prepared by Robert Peccia & Associates from extensive field study and pursuant to the objectives established in Montana's Permanent Program Strip and Underground Mine Reclamation Rules and Regulations, specifically A.R.M. 26.4.1235(3). The primary criteria used for preparing the reclamation plans were the protection of the environment, abatement of adverse impacts of past coal mining activities, protection of human life, health and safety, and the improvement of natural resources.

Robert Peccia & Associates provided quality control inspection services for all of the work executed under MONT A/E 86-46-132.

Attachment No. 1 lists the bid items covered under the contract schedule, lists the approximate quantities, and shows the pertinent information for the bidders on the project. The bid price on the project was \$87,915.00. Final project cost including all additions was \$116,594.00.

Reclamation of the abandoned coal mines on McDonald Divide required excavation and disposal of approximately 7,750 cubic yards of spoils material, excavation and haul of an additional 5,150 cubic yards of spoils material for disposal in four subsidence areas, removal of mine-related debris, closure of numerous adits, drifts and shafts, lime application on 10 acres, fertilizing, seeding and mulching 18 acres, and construction of 10,671 lineal feet of fence.

II. DISCUSSION

Donnes Construction of Billings, Montana, was lowest bidder for the work outlined with a bid of \$87,915.00. The agreement for the project was dated June 9, 1987. The Notice to Proceed was dated June 16, 1987. The contract period was for 45 consecutive calendar days.



The contractor began work on June 16, 1987 and was substantially completed with all work except fertilizing, seeding and mulching on August 28, 1987. Fertilizing, seeding and mulching began on November 2, 1987 and was completed on November 8, 1987.

The primary equipment utilized by the Contractor was:

1. D7 Caterpillar bulldozer
2. Two Terex TS 14 scrapers
3. P&H 418 track-mounted backhoe, and
4. Caterpillar '12' road patrol

The contractor also used an International Farmall 544 tractor, a 12' offset disc, a John Deere 8022 disc-type grain drill and a commercial straw blower manufactured by Finn Equipment Company to complete the fertilizing, seeding and mulching requirements of the project.

Fencing was subcontracted to Terry Comboh of Roundup, Montana. The subcontractor used an International Harvester B275 tractor equipped with a 6-foot front-mounted blade and a rear-mounted 12-inch posthole auger. A Suzuki 185 "Quadrunner" was available to string barbed wire and for use as a general utility vehicle.

Reclamation activity commenced on the Timpano/Butler/Zellick property, referred to as the South Sites. The South Sites consisted of numerous small "wagon mines" located on the west slope of the southern-most end of McDonald Divide. Each individual mine consisted of spoils piles of varying volumes, with one or more adits and associated collapsed drifts. Each site was reclaimed individually by stripping the topsoil and overburden from the collapsed drift to create local deposition areas for spoils material. A larger, centralized deposition area, approximately 100' x 280', was also created to handle excess spoils generated from each site, as well as to provide a topsoil area. This topsoil borrow/spoils disposal area was located above ground of the main workings of the old Gilkerson Mines, as was indicated by the subsidences created by the collapse of the numerous drifts and many large "rooms." Exploratory excavation of several of the drifts showed that they had previously been filled with trash and debris or simply collapsed and were filled with dirt.

The following briefly describes the work performed at each of the individual sites associated with the South Sites.





### Site 1

The work at South Site 1 included excavation and disposal of approximately 100 cubic yards of spoils material and reclamation of .1 acre. Spoils material was hauled to Site 5. Topsoil was not available at Site 1 and was hauled from the borrow source.

### Site 2

The work at South Site 2 included excavation and disposal of approximately 450 cubic yards of spoils, removal of debris, closure of an open adit, and reclamation of .23 acres. Spoils material was placed in the prepared adit cut and excess spoils hauled to Site 5. Topsoil was not available at Site 2 and was hauled from the borrow source.

### Site 3

The work at South Site 3 included excavation and disposal of approximately 1,250 cubic yards of spoils material, closure of an open adit, and reclamation of .71 acres. A topsoil borrow area was created at Site 3. The dimensions of the borrow area were approximately 160' x 175'.

### Site 4

The work at South Site 4 included excavation and disposal of approximately 560 cubic yards of spoils material and reclamation of .28 acres.

### Site 5 and Site 6

The work at Sites 5 and 6 included preparation of a topsoil borrow/spoil disposal area, excavation and disposal of approximately 2,150 cubic yards of spoils, closure of two open adits, exploratory excavation to determine extent of recent subsidence activity, and reclamation of 1.95 acres.

### Site 7

Work at South Site 7 included excavation and disposal of approximately 2,500 cubic yards of spoils material, closure of one open adit and reclamation of .68 acres.

### Site 8

Work at South Site 8 included excavation and disposal of approximately 730 cubic yards of spoils material, demolition and disposal of a dilapidated tipple structure, closure of one open adit and one open shaft, and reclamation of .35 acres.



## Site 9

Work at South Site 9 included excavation and disposal of approximately 165 cubic yards of spoils material and reclamation of .23 acres.

Two additional mine sites were identified between Sites 7 and 8. Approximately 100 cubic yards of spoils material was excavated and two open adits closed. Less than .1 acres was reclaimed.

Fencing of the South Sites was completed on August 17, 1987. Fence construction totaled 4,248 lineal feet of Type F-4 barbed wire fence and three 16' farm gates were installed.

After spoils removal from the South Sites was completed, the earth-moving equipment was moved to the next location, referred to as the North Sites. The North Sites consisted of numerous "wagon mines" along the east and west slopes of the north end of McDonald Divide. Associated with the North Sites were four subsidences resulting from collapse or settlement of the abandoned Great Northern Railroad tunnel which passes beneath McDonald Divide. These subsidences were designated as disposal areas for excess spoils material generated from the individual sites.

Each individual mine site consisted of spoil pile(s) of varying volumes with one or more adits and associated collapsed adit cuts. Several vertical air shafts were identified and closed. An additional disposal site designation was necessitated by the increased volume of spoil material generated over the anticipated quantity. A combination topsoil borrow/disposal area was approved at North Site 8.

The following briefly describes the work performed at each site.

## Site 1

The work at North Site 1 involved four individual mine sites and included excavation, haul and disposal of 2,700 cubic yards of spoils material, closure of three open adits and two open shafts and reclamation of 1.0 acre.

## Site 2

The work at North Site 2 involved three individual mine sites and included excavation, haul and disposal of approximately 2,340 cubic yards of spoils, closure of one open adit, slope reconstruction, and reclamation of .87 acres.



### Site 3

The work at North Site 3 involved six individual mine sites and included excavation, haul and disposal of 1,540 cubic yards of spoils material, closure of one open shaft and one open adit, slope reconstruction and reclamation of 1.25 acres.

### Site 4

The work at North Site 4 included demolition and disposal of a dilapidated tibble structure, excavation, haul and disposal of approximately 1,300 cubic yards of spoils material, closure of one open adit, and reclamation of .66 acres.

### Site 5

The work at North Site 5 involved three individual mine sites and included excavation, haul and disposal of 2,420 cubic yards of spoils material, restoration of a spring channel, closure of one open shaft, exploratory excavation and backfilling of numerous drift subsidences, and reclamation of .84 acres.

### Site 6

The work at North Site 6 involved two individual mine sites and included excavation, haul and disposal of approximately 350 cubic yards of spoils material and reclamation of .35 acres.

### Site 7

The work at North Site 7 involved five individual mine sites and included excavation, haul, and disposal of approximately 2,070 cubic yards of spoils material, disposal of dilapidated mine-related structures and reclamation of 1.33 acres.

### Site 8

North Site 8 was designated as a spoils disposal/topsoil borrow area for the purpose of providing a central location to handle the additional spoils material encountered, as well as supply topsoil for the denuded mine sites where topsoil was unavailable. The work at Site 8 included stripping and stockpiling the topsoil in an area 150' x 350', depositing, compacting and grading the spoils hauled from other sites, and reclamation of 1.2 acres. The mine at Site 8 was incorporated into the disposal area.



#### Site 9

The work at Site 9 included excavation and disposal of approximately 250 cubic yards of spoils material, closure of one open shaft, and reclamation of .15 acres.

#### Site 10

The work at Site 10 included debris disposal, excavation and disposal of approximately 250 cubic yards of spoils material, closure of one open shaft and reclamation of .39 acres.

#### Site 11

The work at North Site 11 involved three individual mine sites and included disposal of large timbers and mine-related structures, excavation and disposal of approximately 450 cubic yards of spoils material, and reclamation of .18 acres.

#### Tunnel Subsidence Disposal Sites

The work at the Tunnel Disposal Sites involved four separate subsidences and included subsidence preparation for spoils deposition, depositing and compacting the spoils and reclamation of 1.05 acres.

Fencing of the North Sites was completed on August 26, 1987. Fence construction totaled 4,649 lineal feet of Type F-4 barbed wire fence and four 16' farm gates were installed.

Following spoils disposal completion at the North Sites, reclamation activity began at the Jackson Sites. The Jackson Sites consisted of four "wagon mines" located west of McDonald Divide. Each mine consisted of a spoil pile of varying volume with associated adit. Each site was reclaimed individually with excess spoils being hauled to a central deposition area. The deposition area was designated at a subsidence resulting from the collapse of a portion of the abandoned Great Northern Railroad tunnel which passes beneath State Highway 87.

The following briefly describes the work performed at each site.

#### Site 1

The work at Jackson Site 1 involved two individual mine sites and included the demolition and disposal of a dilapidated tippie structure, excavation and disposal of approximately 1,220 cubic yards of spoils material, closure of one open adit, and reclamation of 1.27 acres.





## Site 2

The work at Jackson Site 2 involved preparation of the tunnel subsidence for spoils deposition, hauling of spoils to the site, compaction and grading of the spoils materials, and reclamation of .40 acres.

## Site 3

The work at Jackson Site 3 included debris disposal, excavation and disposal of approximately 400 cubic yards of spoils material and reclamation of .15 acres.

## Site 4

Jackson Site 4 is located on the west slope of McDonald Divide, north of the North Sites. The work included at Jackson Site 4 included excavation and disposal of approximately 500 cubic yards of spoils material and reclamation of .17 acres.

Fencing of the Jackson Sites was completed on August 28, 1987. Fence construction totaled 1,774 lineal feet of Type F-4 barbed wire and three 16' farm fence gates were installed.

Change Order #1 was issued for the on-site disposal of approximately 4,000 cubic yards of spoils material located on the Jackson property. The spoils were associated with four additional mine sites not previously discovered. The cost of this Change Order was \$6,600.00

Limestone was applied to all deposition areas and areas previously covered by spoils. A Cat 966D loader with a 5-cubic yard bucket was used to distribute and spread the limestone to each site. Preceding lime application, all sites were measured and a tonnage rate computed. Unit weight of the limestone was measured at 90 lbs./ft<sup>3</sup> and the loader bucket was considered to hold 5 tons. Limestone was applied at 20T/A based on analysis of the spoils material.

Fertilizer was applied to the sites using a commercial, truck-mounted, bulk fertilizer spreader. Fertilizer rates were based on soil analysis. Total fertilizer applied to all sites was 3,420 lbs. (189 lbs/ac.).

The Contractor seeded all areas with a disc-type seed drill. Hay mulch was applied with a commercial mulch blower. This performed poorly because flailing chains tended to chop the straw into sections too short to crimp. Removing the chains alleviated this problem. The straw was crimped with a single gang disc-plow with concave, fluted discs. The crimper worked poorly but the Contractor improved the performance by increasing the weight on the crimper and operating it at a slower speed.



Total straw applied and crimped on all sites was 25.7 T (1.43 T/A). Four hundred fourteen lbs. of pure live seed was used at a rate of 23 lbs/acre.

The final contract price for work completed under MONT A/E 86-46-132 was \$116,594.00 including additions outlined in Change Order #1 totaling \$28,679.00. The final pay request is included as Attachment #2.

The Contractor, Donnes Construction, Inc., did an excellent job of performing the tasks required by the plans and technical specifications. The Contractor recognized the intent of the project and maintained a personal interest and cooperative attitude facilitating an outstanding completion of the project.

Attachment #3 is an analysis of construction costs for the project compared with the engineering costs.



ATTACHMENT #1

BID TABULATIONS



DIVIDE COAL MINES AMR  
MONT. A/E 86-46-132  
Bid Tabulations  
May 26, 1987

Item No.	Description	Unit	Quantity Required	Engineer's Estimate RPA		Donnes Construction 4002 McGirt Road Billings, MT 59107 5996 A		DeBuff Drilling Gillette Road Lewistown, MT 59457 6256 A		McDaniel & Sons P.O. Box 33 Nienhart, MT 59465 5493 A	
				Unit Price	Bid Price	Unit Price	Bid Price	Unit Price	Bid Price	Unit Price	Bid Price
1.	Debris Removal	LS	1.0	\$4,000.00	\$4,000.00	\$10,000.00	\$10,000.00	\$2,000.00	\$2,000.00	\$5,164.00	\$5,164.00
2.	Waste Disposal Pile	LS	1.0	\$22,500.00	\$22,500.00	\$15,075.00	\$15,075.00	\$36,000.00	\$36,000.00	\$29,524.00	\$29,524.00
3.	Haul	CY	5,850.0	\$5.00	\$29,250.00	\$3.00	\$17,550.00	\$2.00	\$11,700.00	\$4.24	\$24,804.00
4.	Close Mine Openings - Adit	EA	11.0	\$660.00	\$9,460.00	\$300.00	\$3,300.00	\$200.00	\$2,200.00	\$267.00	\$2,937.00
5.	Close Mine Openings - Shaft	EA	5.0	\$1,000.00	\$5,000.00	\$500.00	\$2,500.00	\$200.00	\$1,000.00	\$110.00	\$550.00
6.	Lime Application @ 20 tons/ac.	AC	14.1	\$350.00	\$4,925.00	\$1,000.00	\$14,100.00	\$1,100.00	\$15,510.00	\$786.50	\$11,089.65
7.	Fertilize, Seed and Mulch	AC	23.5	\$900.00	\$21,150.00	\$600.00	\$14,100.00	\$600.00	\$14,100.00	\$640.00	\$15,040.00
8.	Remove and Reset Fence	LF	390.0	\$1.00	\$390.00	\$1.00	\$390.00	\$2.00	\$780.00	\$1.00	\$390.00
9.	Farm Fence (Type F-4)	LF	10,300.0	\$1.25	\$12,875.00	\$1.00	\$10,300.00	\$0.80	\$8,240.00	\$0.88	\$9,064.00
10.	Farm Fence Gate (16-ft.)	EA	12.0	\$75.00	\$900.00	\$50.00	\$600.00	\$100.00	\$1,200.00	\$71.00	\$852.00
Total Bid (Actual):				\$96,685.00	\$87,915.00	\$87,915.00	\$87,915.00	\$92,730.00	\$92,730.00	\$99,414.65	\$99,414.65
Total Bid (Contractor):											

Item No.	Description	Unit	Quantity Required	Shumaker Construction P.O. Box 1442 Gt. Falls, MT 59403 5199 A		Williams Bros. Const. P.O. Box 125 Lewistown, MT 59457 5626 A		Montgomery Const. P.O. Box 755 Hilger, MT 59451 6290 A		Miller Const. Co. 620 Crowley Lewistown, MT 59457 5547 A	
				Unit Price	Bid Price	Unit Price	Bid Price	Unit Price	Bid Price	Unit Price	Bid Price
1.	Debris Removal	LS	1.0	\$500.00	\$500.00	\$10,000.00	\$10,000.00	\$11,650.00	\$11,650.00	\$5,000.00	\$5,000.00
2.	Waste Disposal Pile	LS	1.0	\$33,856.00	\$33,856.00	\$37,312.00	\$37,312.00	\$71,450.00	\$71,450.00	\$42,750.00	\$42,750.00
3.	Haul	CY	5,850.0	\$4.00	\$23,400.00	\$3.50	\$20,475.00	\$0.20	\$1,170.00	\$8.00	\$46,800.00
4.	Close Mine Openings - Adit	EA	11.0	\$350.00	\$3,850.00	\$250.00	\$2,750.00	\$700.00	\$7,700.00	\$250.00	\$2,750.00
5.	Close Mine Openings - Shaft	EA	5.0	\$350.00	\$1,750.00	\$250.00	\$1,250.00	\$1,000.00	\$5,000.00	\$200.00	\$1,000.00
6.	Lime Application @ 20 tons/ac.	AC	14.1	\$950.00	\$13,395.00	\$750.00	\$10,575.00	\$1,000.00	\$14,100.00	\$600.00	\$8,460.00
7.	Fertilize, Seed and Mulch	AC	23.5	\$750.00	\$17,625.00	\$800.00	\$18,800.00	\$700.00	\$16,450.00	\$1,250.00	\$29,375.00
8.	Remove and Reset Fence	LF	390.0	\$1.00	\$390.00	\$0.85	\$331.50	\$2.00	\$780.00	\$1.00	\$390.00
9.	Farm Fence (Type F-4)	LF	10,300.0	\$1.00	\$10,300.00	\$0.85	\$8,755.00	\$1.00	\$10,300.00	\$1.00	\$10,300.00
10.	Farm Fence Gate (16-ft.)	EA	12.0	\$48.00	\$576.00	\$100.00	\$1,200.00	\$100.00	\$1,200.00	\$50.00	\$600.00
Total Bid (Actual):				\$105,642.00	\$111,448.50	\$111,448.50	\$111,448.50	\$139,800.00	\$139,800.00	\$147,425.00	\$147,425.00
Total Bid (Contractor):				\$105,642.00	\$111,448.50	\$111,448.50	\$111,448.50	\$139,800.00	\$139,800.00	\$147,425.00	\$147,425.00

\* Error in Contractor's bid. Correct amount shown.





Contractor: Kopitz Contracting  
P.O. Box 585  
Location: Lewistown, PA 17045  
License #: 6023 A

Item No.	Description	Unit	Quantity Required	Unit Price	Bid Price
1.	Debris Removal	LS	1.0	\$15,800.00	\$15,800.00
2.	Waste Disposal Pile	LS	1.0	\$83,000.00	\$83,000.00
3.	Haul	CY	5,850.0	\$3.00	\$17,550.00
4.	Close Mine Openings - Adit	EA	11.0	\$1,000.00	\$11,000.00
5.	Close Mine Openings - Shaft	EA	5.0	\$1,000.00	\$5,000.00
6.	Lime Application @ 20 tons/ac.	AC	14.1	\$900.00	\$12,690.00
7.	Fertilize, Seed and Mulch	AC	23.5	\$700.00	\$16,450.00
8.	Remove and Reset Fence	LF	390.0	\$2.50	\$975.00
9.	Farm Fence (Type F-4)	LF	10,300.0	\$2.50	\$25,750.00
10.	Farm Fence Gate (16-ft.)	EA	12.0	\$150.00	\$1,800.00
Total Bid (Actual):					\$194,015.00
Total Bid (Contractor):					\$194,015.00



ATTACHMENT #2

FINAL PAY REQUEST



# PAYMENT REQUEST NO. 2

FROM: 07/24/87

TO: 09/01/87

PROJECT NAME: Divide Coal Mines AMR Project  
LOCATION: Fergus County, MT

PROJECT NO.: Mont A/E 86-46-132

CONTRACTOR: Donnes Construction

ADDRESS: 4002 McGirl Road  
Billings, MT 59105

## SUMMARY OF PROJECT STATUS

Amount of Original Contract	\$87,915.00
Amount of Approved Change Order(s)	\$28,679.00
TOTAL CONTRACT AMOUNT	\$116,594.00

Contract Time Used to Date (in days)	90
Percentage of Contract Time Used	100.0%
Percentage of Contract Amount Earned	100.0%

Total Contract Amount Completed	\$116,594.00
Amount for Materials on Site	\$0.00
TOTAL TO DATE	\$116,594.00

x 90% = Total Amount Earned to Date	N/A
Less Previous Amount Earned	\$64,093.95

Amount Payable This Period	\$52,500.05
Less 1% Gross Receipts Tax	\$525.00
TOTAL DUE CONTRACTOR THIS PERIOD	\$51,975.05

REQUESTED BY: DONNES CONSTRUCTION

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Contractor

CHECKED BY: ROBERT PECCIA & ASSOCIATES, INC.

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Engineer

APPROVED BY: DEPARTMENT OF STATE LANDS  
ABANDONED MINE RECLAMATION BUREAU

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Owner



PAYMENT REQUEST NO. 2

PROJECT NAME: Divide Coal Mines AMR Project

PROJECT NO: Mont A/E 86-46-132

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF ESTIMATED QUANTITY COMPLETE
1.	Debris Removal	1.0 LS	\$10,000.00	0.1	1.0	\$10,000.00	100.0%
2.	Waste Pile Disposal	1.0 LS	\$15,075.00	0.1	1.0	\$15,075.00	100.0%
3.	Haul (Quantity Adj. by C.O. #1, Item 1)	14,440.0 EA	\$3.00	0.0	14,440.0	\$43,320.00	100.0%
4.	Close Mine Openings-Adit (Quantity Adj. by C.O. #2, Item 1)	13.0 EA	\$300.00	2.0	13.0	\$3,900.00	100.0%
5.	Close mine Openings-Shaft (Quantity Adj. by C.O. #2, Item 2)	6.0 EA	\$500.00	2.0	6.0	\$3,000.00	100.0%
6.	Lime Application @ 20 Tons per Acre (Quantity Adj. by C.O. #2, Item 3)	9.0 AC	\$1,000.00	9.0	9.0	\$9,000.00	100.0%
7.	Fertilize, Seed and Mulch (Quantity Adj. by C.O. #2, Item 11)	23.5 AC	\$600.00	18.0	18.0	\$10,800.00	100.0%
8.	Remove and Reset Fence (Quantity Adj. by C.O. #2, Item 4)	228.0 LF	\$1.00	200.0	228.0	\$228.00	100.0%
9.	Farm Fence (Type F-4) (Quantity Adj. by C.O. #2, Item 5)	10,671.0 LF	\$1.00	10,671.0	10,671.0	\$10,671.00	100.0%
10.	Farm Fence Gate (16-ft.) (Quantity Adj. by C.O. #2, Item 6)	9.0 EA	\$50.00	9.0	9.0	\$450.00	100.0%
Subtotal						\$106,444.00	
Previous Amount for Materials on Site						\$0.00	
Amount for Materials on Site this Request						\$0.00	
Less Amount Incorporated In Work						\$0.00	
Subtotal Amount for Materials on Site						\$0.00	
Change Order Items Not Included Above:							
Change Order No. 2, Item 7						\$8,250.00	
Change Order No. 2, Item 8						\$200.00	
Change Order No. 2, Item 9						\$700.00	
Change Order No. 2, Item 10						\$1,000.00	
Subtotal Additional Change Order Items						\$10,150.00	
TOTAL						\$116,594.00	





ATTACHMENT #3

ANALYSIS OF CONSTRUCTION  
AND ENGINEERING COSTS



ANALYSIS OF CONSULTANT COSTS INCURRED  
 FOR THE MONTANA DEPARTMENT OF STATE LANDS  
 ABANDONED MINE RECLAMATION BUREAU  
 AMR PROJECT NUMBER: MONTANA A/E 86-46-132  
 DIVIDE COAL MINES AMR PROJECT  
 RPA PROJECT NUMBERS: 86-03.9, 87-30.8 AND 87-30.9  
 DATE OF PREPARATION: DECEMBER 18, 1987

ENGINEERING SERVICE	AMOUNT
*****	
DESIGN ENGINEERING:	
1986 CONTRACT	\$11,100.29
1987 CONTRACT	\$12,722.10
	-----
SUBTOTAL DESIGN ENGINEERING COST:	\$23,822.39
	-----
CONSTRUCTION ENGINEERING AND PROJECT ADMINISTRATION COST:	
1986 CONTRACT	\$0.00
1987 CONTRACT	\$20,706.56
	-----
SUBTOTAL CONSTRUCTION ENGINEERING COST:	\$20,706.56
	-----
PROJECT ENGINEERING COST:	\$44,528.95
	=====
CONSTRUCTION COST:	\$116,594.00
	=====

\*\*\*\*\*

TO CALCULATE PERCENTAGE ENGINEERING FEES TO CONSTRUCTION COST:

DESIGN ENGINEERING/CONSTRUCTION COST	20.4319%
CONSTRUCTION ENGINEERING/CONSTRUCTION COST	17.7595%
TOTAL ENGINEERING COST/CONSTRUCTION COST	38.1915%

\*\*\*\*\*

EDIT DATE: DECEMBER 18, 1987-----JHP





